REMARKS

This application has been reviewed in light of the Office Action dated April 23, 2003. Claims 1, 3-7, 9-16 and 18-20 are now presented for examination. Claims 2, 8 and 17 have been cancelled without prejudice. Claims 1, 7, and 16 have been amended to more particularly point out and distinctly claim the subject matter regarded as the invention. Claims 1, 7, and 16 are independent. Favorable review is respectfully requested.

Objection to the Drawings

The drawings were objected to as failing to comply with 37 C.F.R. § 1.84(p)(5). The Examiner stated that reference sign "100" appeared in the drawings but did not appear in the description. The Examiner's attention is respectfully directed to page 8, line 3 of the specification, which mentions "the underlying level 100." It is therefore requested that this objection be withdrawn.

Objection to the Claims

Claim 16 was objected to because of informalities. The informality noted by the Examiner has been corrected by amending "lower layer" to read "lower hardmask layer".

Rejections under 35 U.S.C. § 102(e) and § 102(g)

Claims 1, 4-7, 9 and 10 were rejected under 35 U.S.C. § 102(e) as being anticipated by Fornof et al. (U.S. Pat. No. 6,537,908). Claims 1, 3-7, 9-11 and 15 were rejected under 35 U.S.C. § 102(g) as being anticipated by Dalton et al. (U.S. Appln. No. 09/550,943).

Applicants wish to point out that the features of cancelled claims 2, 8 and 17 have been incorporated into independent claims 1, 7 and 16 respectively. Specifically, the independent claims now recite (i) that the top hardmask layer is of a material selected from the group consisting of refractory metals, refractory metal nitrides, refractory metal alloys, doped amorphous silicon and doped silicon; and (ii) that the top hardmask layer is formed using a vapor deposition process (see specification, page 7, lines 4-5).

The above-described amendments to the claims are believed to overcome the rejections under 35 U.S.C. § 102(e) and § 102(g). In particular, it is noted that neither Fornof et al. nor Dalton et al. teach a top hardmask layer of a material selected from the group consisting of refractory metals, refractory metal nitrides, refractory metal alloys, doped amorphous silicon and doped silicon. Furthermore, neither reference teaches that this top hardmask layer is formed using a vapor deposition process, as now recited in the independent claims. The present invention, as defined in amended independent claims 1, 7 and 16, is therefore not anticipated by either of the cited references.

Rejections under 35 U.S.C. § 103(a)

Claims 2 and 8 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Dalton et al. in view of Fornof et al. Claims 2 and 8 have been cancelled, with the features of those claims now incorporated in independent claims 1 and 7 respectively. Furthermore, independent claims 1 and 7 now recite a top hardmask layer which is formed using a vapor deposition process. Applicants respectfully submit that amended independent claims 1 and 7 are patentable over the art cited by the Examiner, for the following reasons.

As noted by the Examiner, Dalton et al. does not teach that the top hardmask layer is of a material selected from the group consisting of refractory metals, refractory metal nitrides, refractory metal alloys, doped amorphous silicon and doped silicon. Furthermore, no teaching or suggestion regarding such hardmask material is found in Fornof et al. Fornof et al. is concerned with providing a hardmask using materials formed by spin-on coating (col. 4, lines 46-51). Fornof et al. explicitly states that forming a hardmask layer by a vapor deposition process is to be avoided (col. 2, lines 12-16 and 53-65). Even if, as suggested by the Examiner, one following the teaching of Fornof et al. added a third layer to the hardmask, he would be motivated only to use materials consistent with a spin-on coating process. A combination of Dalton et al. and Fornof et al. would at best

yield a process for forming a multiple-layer hardmask wherein each of the layers is formed by spin-on coating.

The applicants respectfully submit that it is clear from the foregoing discussion that the teaching of Dalton et al. and Fornof et al. provide a different process to achieve an objective that is clearly distinct from the applicants' claimed invention. Furthermore, the applicants submit that the cited references, alone or in combination, provide no motivation to one of ordinary skill in the art to achieve the applicants' claimed invention. Accordingly, the differences between the applicants' claimed invention and the two references are such that the applicants' claimed invention would not have been obvious to one of ordinary skill in the art at the time of applicants' invention.

Claims 12-14, dependent from claim 7, were rejected under 35 U.S.C. § 103(a) as being unpatentable over Fornof et al. in view of Catabay et al. (U.S. Pat. No. 6,503,840). Catabay et al. is not understood to disclose or suggest a top hardmask layer of the above-noted materials, or formed using a vapor deposition process. Accordingly, Catabay et al. does not remedy the above-described defects of Fornof et al. as a reference against the present invention. The present invention therefore would not have been obvious from Catabay et al., considered either alone or in combination with Fornof et al.

Claims 16 and 18-20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Shaffer, II et al. (U.S. Pat. Appln. Pub. 2002/0052125) in view of Catabay et al. Claim 17 was

rejected under 35 U.S.C. § 103(a) as being unpatentable over Shaffer, II et al. in view of Catabay et al., and further in view of Fornof et al. Claim 17 has been cancelled, thereby rendering rejection of that claim moot. As noted above, independent claim 16 now recites a top hardmask layer (i) of a material selected from the group consisting of refractory metals, refractory metal nitrides, refractory metal alloys, doped amorphous silicon and doped silicon; and (ii) formed using a vapor deposition process. These features of the invention are not disclosed or suggested in Catabay et al. or in Fornof et al., as discussed above. Shaffer, II et al. is understood to disclose hardmasks formed of organosilicate resins. There is no teaching or suggestion in Shaffer, II et al. of a top hardmask layer of the material recited in independent claim 16. Accordingly, it is submitted that none of the cited references, considered alone or in combination, suggest the above-described features of amended independent claim 16. The present invention thus would not have been obvious from those references.

The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual consideration of the patentability of each on its own merits is respectfully requested.

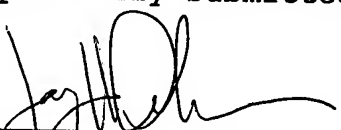
CONCLUSION

In view of the foregoing amendments and remarks, Applicants respectfully request favorable consideration and early passage to issue of the present application.

A Transmittal of Formal Drawings is submitted herewith.

Applicants' undersigned attorney may be reached by telephone at (845) 894-3667. All correspondence should continue to be directed to the below listed address.

Respectfully submitted,



Jay H. Anderson
Attorney for Applicants
Registration No. 38,371

INTERNATIONAL BUSINESS MACHINES CORPORATION
Intellectual Property Law Department
B/300-482
2070 Route 52
Hopewell Junction, New York 12533
Facsimile: (845) 892-6363